

WHAT IS CLAIMED IS:

1. A nozzle, comprising:
a housing; and
an assembly including at least two deformable conjugated parts
separated by a spacer seal, the assembly being arranged in the housing so as to form a
nozzle outlet, the housing or the parts or the spacer seal being deformable so as to
define a geometry of the nozzle outlet and seal surfaces between the parts and the
spacer seal and between the parts and the housing.
2. A nozzle according to claim 1, wherein the housing is fabricated from
material having a lower hardness than the parts and the spacer seal.
3. A nozzle according to claim 1, wherein the parts and the spacer seal are
configured so that a force needed for inserting the assembly into the housing exceeds
a force needed for plastic deformation of the housing and the assembly.
4. A nozzle according to claim 3, wherein the housing is cylindrical, the
parts are circle segments, and the spacer seal is rectangular.
5. A nozzle according to claim 4, wherein the spacer seal has a thickness in
a range of less than 5 cm.
6. A nozzle according to claim 4, and further comprising a deformable ring
arranged between an inner shoulder of the housing and the assembly so as to seal the
outlet of the nozzle.

7. A nozzle according to claim 1, wherein a spacing between the parts forming the nozzle outlet is uniform.

8. A nozzle according to claim 6, and further comprising another deformable ring arranged in the housing against the assembly so as to seal an inlet of the nozzle.

9. A nozzle according to claim 4, wherein a plurality of conjugated parts and spacer seals are arranged in a sequence so as to form parallel openings.

10. A nozzle according to claim 9, wherein the assembly is configured to form several streams that focus at a common point.

11. A nozzle according to claim 1, wherein the housing has a rectangular internal cross-sectional shape.

12. A nozzle according to claim 1, wherein the housing includes two bodies that form a ring which contains the assembly.

13. A nozzle according to claim 1, wherein the parts or the spacer seal are/is made of a shape memory alloy so that by controlling temperature of the parts or the spacer seal fabricated out of the shape memory alloy provides on-line control of properties of a jet exiting the nozzle.

14. A nozzle according to claim 1, wherein the nozzle outlet has a curved shape.

15. A nozzle according to claim 1, wherein the nozzle outlet has a zig-zag shape.

16. A nozzle according to claim 1, wherein the nozzle outlet is discontinuous.

17. A nozzle according to claim 1, wherein the nozzle outlet is formed by openings on alternate opposite sides of a center line.

18. A nozzle according to claim 1, wherein the nozzle outlet is a discontinuous circular or ring annulus.

19. A nozzle according to claim 1, wherein the spacer seal is made of a brazable material.

20. A nozzle according to claim 1, wherein the spacer seal is formed by diffusion bonding that occurs at an interface between the conjugated parts.

21. A nozzle according to claim 1, wherein the spacer seal is a coating, deposition, or plating.

22. A nozzle according to claim 21, wherein the spacer seal is made of gold.

23. A nozzle device, comprising:

a first, inner nozzle having a housing, and an assembly including at least two conjugated parts separated by a spacer seal, the assembly being arranged in the housing so as to form a nozzle outlet, at least one of the housing, the parts and the

spacer seal being deformable so as to define a geometry of the nozzle outlet and seal surfaces between the parts and the spacer seal and between the parts and the housing, wherein the housing is cylindrical, the parts are circle segments, and the spacer seal is rectangular; and

a second, outer nozzle having a housing, and an assembly including at least two conjugated parts separated by a spacer seal, the assembly being arranged in the housing so as to form a nozzle outlet, at least one of the housing, the parts and the spacer seal being deformable so as to define a geometry of the nozzle outlet and seal surfaces between the parts and the spacer seal and between the parts and the housing, wherein the housing is cylindrical, the parts are circle segments, and the spacer seal is rectangular, an inlet of the second nozzle being in fluid communication with the outlet of the first nozzle, at least one passageway between the first nozzle housing and the second nozzle housing communicating with a mixing chamber disposed between the first nozzle outlet and the second nozzle inlet.

24. A nozzle device according to claim 23, wherein the mixing chamber has an outlet channel that carries a mixture of substances supplied by the two nozzles.

25. A method for forming a jet, comprising the steps of:

providing a housing;

arranging an assembly including at least two conjugated parts separated by a spacer seal in the housing so as to form a nozzle outlet, the housing, or the parts, or the spacer seal being deformed so as to define a geometry of the nozzle outlet and seal surfaces between the parts and the spacer seal and between the parts and the housing; and

supplying a fluid to an inlet side of the housing.

26. A method according to claim 25, including fabricating the housing from a material having a lower hardness than the parts and the spacer seal.

27. A method according to claim 25, wherein the step of arranging the assembly in the housing includes applying a force to the assembly during insertion into the housing which exceeds the force needed for plastic deformation of the housing and the assembly.

28. A method according to claim 25, further including arranging a deformable ring between an inner shoulder of the housing and the assembly so as to seal the nozzle outlet.

29. A method according to claim 25, including fabricating at least one of the spacer seal and the parts from a shape memory alloy.

30. A method according to claim 28, further including arranging another deformable ring in the housing against the assembly so as to seal an inlet of the nozzle.

31. A method according to claim 25, wherein the spacer seal is made of a brazable material that is melted after the assembly is arranged in the housing and subsequently solidified to form a seal.

32. A method according to claim 31, wherein the spacer seal is melted by induction heating.

33. A method according to claim 25, including shrink fitting or expansion fitting the parts so as to form a seal when the parts subsequently cool down or are heated up.

34. A method according to claim 25, wherein the spacer seal is formed by diffusion bonding between opposing surfaces of the conjugated parts.

35. A method producing a nozzle for forming a jet, comprising the steps of:
providing a housing;
providing at least two conjugated parts with opposing surfaces;
forming a recess in at least one of the surfaces;
polishing the surfaces so that diffusion bonding can take place when the surfaces are placed together; and
inserting the parts into the housing so that the polished surfaces contact one another whereby diffusion bonding occurs to bond the polished surfaces of the parts together and form a spacer seal between the parts so that a nozzle outlet is formed.